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Effects of atomic radiation

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Note by the Secretary-General

1. In its resolution 52/55 of 10 December 1997, the General Assembly invited the International Atomic Energy Agency and the World Health Organization to consider the functions and role of the United Nations Scientific Committee on the Effects of Atomic Radiation and to submit a recommendation to the Assembly at its fifty-third session.

2. The Secretary-General has the honour to transmit to the General Assembly the attached report, which was prepared by the International Atomic Energy Agency.

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Annex

Report prepared by the International Atomic Energy Agency

I. Functions and role of the United Nations Scientific Committee on the Effects of Atomic Radiation

1. In performing its functions and role, the Committee reviews published reports and technical documents submitted by States Members of the United Nations, the specialized agencies and the International Atomic Energy Agency (IAEA) and then estimates levels and effects of exposure to ionizing radiation. It reports to the Assembly, submitting brief progress reports on its activities most years and a substantive report on its findings every five years or so. The latest substantive report was issued in three parts, in 1993, 1994 and 1996.[a]

2. At the time when the Committee was established, there was widespread concern in many countries about the hazards of radioactive fallout disseminated by the then ongoing testing of nuclear weapons in the atmosphere. The Committee's activities have since expanded to cover the collection and evaluation of information on levels of ionizing radiation in general, including radiation from sources other than nuclear-weapons tests. Thus, the sources of exposure to ionizing radiation currently assessed by the Committee include: the natural background (cosmic rays incident upon the Earth and terrestrial radionuclides present everywhere in the environment – and also in the human body itself); human activities and practices such as the production and use of radioisotopes and radiopharmaceuticals, medical and industrial applications of radiation, and nuclear power production (including the mining and milling of uranium ores); and the radioactive residues from past nuclear-weapons testing and radiation accidents.

3. The Committee also studies the biological effects of exposure to ionizing radiation and estimates the inherent risks of harm to health from such exposure. These effects include acute tissue damage from high radiation doses (so-called deterministic effects), such as those resulting from overexposure in the course of accidents, and late somatic and hereditary effects attributable to low-level radiation doses (so-called stochastic effects). Risk coefficients for stochastic effects are estimated from epidemiological studies of radiation-exposed population groups, including the survivors of the atomic bombings of Hiroshima and Nagasaki, patients exposed to radiation for diagnostic or therapeutic purposes, radiation workers, and individuals exposed to enhanced environmental radiation. They are also estimated in the light of the findings of radiobiological research. The results of the Committee's assessments are the basis for quantitative estimates of the health effects of radiation exposure on human populations.

4. In 1995, the Committee embarked upon a new programme for reviewing sources of exposure to ionizing radiation and its biological effects. According to present expectations, a comprehensive report with detailed scientific annexes will be published in the year 2000. The Committee's assessments will, as in the past, constitute an authoritative basis for evaluating and comparing exposures to ionizing radiation from the various sources. Further understanding of the mechanisms of cellular damage caused by and of cellular responses to ionizing radiation and the biological effects in organisms will provide a sounder basis for determining the risks of radiation exposure. The Committee is to examine the data available for assessing the risks of radiation-induced malignancies and hereditary effects at low doses and dose rates. Increased emphasis is being placed by the Committee on the assessment of combined – synergistic – effects of ionizing radiation and other genotoxic agents.

5. Thanks to its independent method of operation and the quality of its reports, the Committee has contributed substantially to the quest for a safe radiation environment and become a worldwide authority in its field. IAEA is of the view that the Committee has fulfilled in an exemplary manner the functions and role assigned to it by the General Assembly in resolution 913 (X) of 3 December 1955 and that the Committee's functions and role, which are of major importance to IAEA, continue to be appropriate.

II. Administrative arrangements for the Committee secretariat

6. The Committee is served by a secretariat, currently consisting of one Professional staff member (the Director of the secretariat, at present Burton Bennett) and two General Service staff members. Documents for review by the Committee are prepared mainly by consultants whose services are often made available free of charge by United Nations Member States. The financial resources of the Committee are provided by the General Assembly through the programme budget of the United Nations.

7. The Committee secretariat was originally located in New York, at the Headquarters of the United Nations, with the Office of the Under-Secretary-General for Special Political Affairs responsible for administrative arrangements. The idea then arose of transferring it to Europe, apparently in order to facilitate liaison with the secretariats of relevant international organizations based in Europe, such as IAEA and the World Health Organization (WHO), and with the secretariat of the United Nations Environment Programme (UNEP), which was to have a regional office in Geneva. In 1974 the Assembly accepted an offer of accommodation made by the Government of Austria, and the Committee secretariat was transferred to Vienna.

8. In 1976, the secretariat of the Committee was attached to UNEP, ceasing to be an administrative responsibility of the Office of the Under-Secretary-General for Special Political Affairs. In accordance with an agreement between the Director-General of the United Nations Industrial Development Organization (UNIDO) and the Executive Director of UNEP, however, administrative support services for the Committee secretariat were provided by the UNIDO secretariat. With its establishment in 1979, the United Nations Office at Vienna assumed responsibility for providing such services for the Committee secretariat.

III. Relationship between the International Atomic Energy Agency and the Committee

9. IAEA and the Committee have a broad area of common professional interests and expertise – namely, the study of the levels and biological effects of exposure to ionizing radiation. However, the functions and role of IAEA in this area differ somewhat from those of the Committee. They are, as spelled out in the IAEA Statute, to establish standards of safety for protection of health against ionizing radiation and to provide for the application of these standards at the request of States. Nevertheless, when formulating such standards IAEA has relied on the Committee's estimates of the health risks associated with exposure to ionizing radiation, those estimates being considered to represent the United Nations position on the subject. For example, the Committee's estimates have served as the basis for the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, which were approved by the IAEA Board of Governors in September 1994.[b]

10. Because of their similar professional responsibilities, it is not surprising that IAEA and the Committee have a history of close cooperation. Their cooperation started as early as 1959, when the Committee and IAEA joined together in helping IAEA member States to promote a worldwide system of radiation measurements,[c] and in 1961 the Director General made a commitment to consult with the Committee on issues such as emergency assistance in connection with radiation accidents.[d]

11. In the early years of the two organizations, however, the cooperation between the Committee and IAEA was from time to time a matter of concern for some IAEA member States. For example, in 1961 one member State expressed the view that IAEA, as an organization seeking to accelerate and enlarge the contribution of atomic energy to peace throughout the world, should not be connected with the Committee, whose estimates related mainly to the radiological consequences of nuclear-weapons testing, and it was even stated on another occasion that IAEA activities on intakes of radionuclides into the human organism represented an "intrusion" into the Committee's sphere of competence;[e] and, in 1962, a proposal to hold an IAEA symposium on the biological effects of neutron irradiation was queried on the grounds that the subject also concerned the Committee.

12. As the practice of nuclear-weapons testing in the atmosphere declined and the scope of the Committee's activities expanded, the relationship between IAEA and the Committee called for closer coordination. In June 1971, when the relationship between the two was discussed in the IAEA Board of Governors, a member State observed in a memorandum that the Committee had enlarged the scope of its activities to include some IAEA functions,[f] and it was suggested that the members of the Committee, which were also States members of IAEA, should examine the question of avoiding duplication of effort.[g] In that context, the Director General stated in June 1971 that cooperation with the Committee had been good but, since the Committee would in future be concentrating more on the peaceful uses of atomic energy, care should be taken to avoid duplication.[h] However, some IAEA member States, which clearly felt that the Committee and IAEA had useful complementary functions, were less concerned about the potential for duplication than about the independence of the Committee. The Chairman of the IAEA Board of Governors summarized the Board position at the time by saying that cooperation between IAEA and the Committee should be intensified.[i]

13. The cooperation between IAEA and the Committee continued to grow in the mid-1970s, with the transfer of the Committee to Vienna being noted in the IAEA annual report

for 1974/75.[j] Since the early 1980s, the work of the Committee has been reported on in the IAEA annual *Nuclear Safety Reviews*, which are submitted to the IAEA Board of Governors and published by IAEA. In 1984, during the Board's discussion of the *Nuclear Safety Review, 1983*, it was stated that the present conceptual consistency of radiological safety was due, *inter alia*, to the work of the Committee, to which IAEA had made a significant contribution.[k]

14. Cooperation between the Committee and IAEA grew even further in the 1980s. An important stage was the work done on revising the definition of "high-level radioactive waste or other high-level radioactive matter unsuitable for dumping at sea" required by the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter.

15. Cooperation between the two was closest in the late 1980s, in the aftermath of the Chernobyl accident: the Committee secretariat and the IAEA secretariat both carried out several surveys relating to the accident; the Committee secretariat joined with IAEA in carrying out the International Chernobyl Project; and it cooperated with IAEA, the European Commission and WHO in the organization of the major 1996 conference entitled "One Decade after Chernobyl – Summing up the Consequences of the Accident". However, this was not the only case of cooperation between the two in the aftermath of an accident: in 1993, following an explosion at a reprocessing plant in Tomsk, Russian Federation, the Committee secretariat took part in the IAEA mission that assessed the radiological consequences.

16. Since then, the Committee secretariat has taken a very active part in the 1995 IAEA assessment of the radiological situation and the need for remediation at the Bikini Atoll in the Marshall Islands and is currently taking a very active part in a similar assessment organized by IAEA at the Atolls of Mururoa and Fangataufa in French Polynesia, which started in 1996.

17. Lastly, there was close cooperation between the Committee and IAEA (and WHO) in organizing the 1997 International Conference entitled "Low Doses of Ionizing Radiation: Biological Effects and Regulatory Control", held in Seville, Spain, at which the Committee's present Chairman, Alexander Kaul (Germany), and the present Director of the Committee secretariat submitted the latest Committee estimates in a keynote presentation on sources, exposures and biological effects of ionizing radiation.

IV. The Committee's reporting arrangements

18. A proposal for merging the Committee's secretariat with the IAEA secretariat was considered by the General Assembly in 1991. In section 17, paragraph 3, of General Assembly resolution 46/185 C of 20 December 1991, the Assembly requested the Secretary-General to study the possibility of alternative arrangements for the secretariat of the United Nations Scientific Committee on the Effects of Ionizing Radiation, including its possible merger with the International Atomic Energy Agency, and to report to the General Assembly at its forty-seventh session. The request, which may have been prompted by the fact that both bodies are based in Vienna and concerned with ionizing radiation, was considered in the light of the mandates and structures of IAEA and the Committee.

19. The IAEA secretariat felt that it was important to preserve the Committee's full independence and, in February 1992, in the IAEA Board of Governors, the Director General said that the initiative regarding a possible merger had not come from the Agency, which had not, in fact, been consulted. The Committee's mandate, which involved the scientific review and evaluation of the levels and effects of ionizing radiation, was quite distinct from that of the Agency. It was his view, therefore, that to maintain their effectiveness the two organizations should remain separate.[l]

20. The Committee addressed the merger issue in June 1992, and in a report to the General Assembly it stated that the Committee concluded that the alternative arrangements for its secretariat suggested in General Assembly resolution 46/185 C of 20 December 1991 might well prejudice the perception of both its authority and its independence.[m]

21. Since then, there have been two developments which may have implications for the Committee's reporting arrangements: the adoption by the General Assembly, on 10 September 1996, of the Comprehensive Nuclear-Test-Ban Treaty and the initiation of the current measures to strengthen the United Nations system.

22. The present situation as far as the Committee's reporting arrangements are concerned can be inferred from General Assembly resolution 52/55, which refers in its preamble to Assembly resolution 51/241 of 31 July 1997. It should be recalled that in that resolution the Assembly, when taking note of the report of the Open-ended High-level Working Group on the Strengthening of the United Nations System,[n] called upon the relevant intergovernmental bodies to implement fully the measures specified in the text contained in the annex to the resolution to strengthen the

work of the United Nations system, in particular of the General Assembly and the Secretariat, and invited, *inter alia*, the specialized agencies and other bodies of the United Nations system to implement the measures for strengthening the system that are specified in the text contained in the annex to the resolution and that are within their respective areas of competence. In paragraph 38 of the annex to Assembly resolution 51/241, it is recommended that the Assembly invite IAEA and WHO to consider the Committee's functions and role and to submit a recommendation to it in 1998 and that the Committee should be asked to submit its next report to IAEA and WHO as well as to the Assembly, which would discuss the report along with any evaluation of it by IAEA and WHO.

V. Recommendation to the General Assembly

23. In the light of this background, IAEA still considers that the Committee should continue to perform its present functions and role and that its authority and independence should be preserved. **IAEA therefore recommends that the General Assembly maintain the present functions and role of the Committee, including the present reporting arrangements.**

24. Noting that the General Assembly has in the past considered alternative arrangements for the Committee, including its possible merger with IAEA, should the Assembly decide to alter the institutional arrangements for the Committee (notwithstanding the recommendation made in paragraph 23 above), IAEA is of the view that the Committee should be attached to IAEA, since it is the United Nations system organization that benefits most from the Committee's expertise and contributes most to its activities. Under any such alternative arrangements, IAEA would ensure that the Committee's authority and independence were still maintained.

VI. Evaluation of the report of the Committee to the General Assembly

25. The report informs the General Assembly of the activities of the Committee and presents its views on its specific role and functions as well as its programme and methods of working.

26. In line with the IAEA recommendation, the Committee recommends that the General Assembly maintain the present functions and role of the Committee, including the present reporting arrangements.

27. The report recalls the establishment of the Committee by resolution of the General Assembly in 1955, when the principal concern was the hazards of radionuclides in the environment as a result of the atmospheric testing of nuclear weapons. Over the succeeding 43 years, the focus of the Committee has broadened to cover the assessment of man-made radionuclides released to the environment from the large growth of civil nuclear power programmes and the use of radionuclides in medicine, agriculture and industry. There has also been a growing realization of the extent to which mankind is exposed to natural sources of ionizing radiation. The report points out that it is the Committee's substantive periodic reports to the General Assembly rather than the annual progress reports that have reviewed these changing levels of dose.

28. Over the period since 1955, the Committee has kept under review epidemiological, experimental and, recently, molecular biology studies on radiation effects. The Committee regularly scrutinizes the available data, especially the Japanese survivor data, to assess the cancer risk estimates. It also reviews the evidence for harmful effects in future generations.

29. The Committee has become the primary international scientific body reviewing and assessing the health risks of exposure to ionizing radiation. Its estimates have been, and are still being, used by major international bodies such as the International Commission on Radiological Protection (ICRP) and by United Nations organizations, including WHO, ILO, FAO and IAEA, as the basis for international standards of protection.

30. The participants in the meetings of the Committee are representatives of its 21 States members (and their advisers) and observers from relevant international organizations. Both WHO and IAEA send observers to attend the Committee sessions, and there is close collaboration with them in the development of Committee reports. For this reason, the Committee does not see the need for pre-publication evaluation of its reports by WHO or IAEA. It also comments that such evaluation could be seen as adversely influencing the independent perspective which is essential for the credibility of its reports. IAEA concurs with this view and emphasizes the importance of the Committee maintaining full and independent responsibility for the content and conclusions of its scientific reports.

31. The report outlines the scientific topics to be covered in the future programme of work. These follow the

established areas of competence of the Committee and include such topics as:

- A review of all the information available on the Chernobyl accident, particularly the reported high incidence of thyroid cancers in those exposed as children;
- The continuous assessment of cancer mortality and incidence data of survivors of Hiroshima and Nagasaki and validation of derived risk estimates with those from studies of medically or occupationally exposed groups;
- A review of the possibility of harm in the progeny of exposed persons and the alteration and loss of genetic information by damage to the DNA in human cells;
- Compiling information originating from many countries to assess both the level of exposure and the associated risk from radon in buildings;
- Keeping under review the population exposure resulting from the disposal of radioactive waste and residues arising from, *inter alia*, the decommissioning of nuclear facilities;
- Assessing the global trend in diagnostic x-ray examinations, and use of radiopharmaceuticals, and radio therapy;
- Drawing attention to accidents with medical sources.

The IAEA considers that all these topics are of great interest to its activities.

32. IAEA will continue to use the Committee's estimates to support its statutory functions of establishing standards for the protection of health against ionizing radiation and of providing for the application of these standards at the request of States.

Notes

[a] United Nations publications, Sales Nos. E.94.IX.2, E.94.IX.11 and E.96.IX.3.

[b] See IAEA document GOV/OR.847.

[c] See IAEA documents GOV/517 and GOV/OR.191.

[d] See IAEA document GOV/650.

[e] See IAEA documents GOV/OR.246 and GOV/OR.248.

[f] See IAEA document GOV/OR.440.

[g] See IAEA documents GOV/1454 and GOV/1475.

[h] See IAEA document GOV/OR.440.

[i] Ibid. The position of the United Nations Secretary-General at that time was that any change in the UNSCEAR reporting arrangements would have constitutional implications.

[j] See IAEA documents GOV/1735, 1735/Add.1/Rev.1 and 1735/Add.2 and GOV/OR.478.

[k] See IAEA document GOV/OR.622.

[l] See IAEA document GOV/OR.773.

[m] See General Assembly document A/47/293.

[n] *Official Records of the General Assembly, Fifty-first Session, Supplement No. 24* (A/51/24).